Lectures

8th Semester B. Tech. Mechanical Engineering

Subject: Internal Combustion Engines

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Topic: Examples Of Engines As Per Engine Design And Operating Parameters

The following **table** give you the design and operating parameters based specifications as per **state of the art of internal combustion engines** with respect to different class of engines.

The tabulated design parameters help you to understand how the engine design differs in both spark ignition engine category and compression ignition or diesel engine category.

Further the operating parameters will tell you how effective or acceptable the engine design is as this data is related to its performance.

Further these design and operating parameters will serve you as a reference for engine design for **future emission norms** as well as **alternative fuels**.

Table 2: Typical Design And Operating Data For Internal Combustion Engines

Design Parameters				Operating Parameters - Rated Maximum				
Engine Type	Operating Cycle	Compression Ratio	Bore, m	Stroke/Bore Ratio	Speed, rpm	BMEP, atm.	Power per unit volume, KW/dm^3	Weight/Power Ratio, Kg/KW	Approx. best BSFC, g/KW h
Spark ignition engines								
Small (e.g., motor cycles)	2S, 4S	6 – 11	0.05 – 0.085	1.2 – 0.9	4500 – 7500	4 – 10	20 – 60	5.5 – 2.5	350
Passenger Cars	4S	8 – 10	0.07 – 0.1	1.1 – 0.9	4500 – 6500	7 – 10	20 – 50	4 – 2	270
Trucks	4S	7 – 9	0.09 – 0.13	1.2 – 0.7	3600 – 5000	6.5 – 7	25 – 30	6.5 – 2.5	300
Large Gas Engines	2S, 4S	8 – 12	0.22 – 0.45	1.1 – 1.4	300 – 900	6.8 – 12	3 – 7	23 – 35	200

Table 2 Continued: Typical Design And Operating Data For Internal Combustion Engines

Design Parameters					Operating Parameters - Rated Maximum				
Engine Type	Operating Cycle	Compression Ratio	Bore, m	Stroke/Bore Ratio	Speed, rpm	BMEP, atm.	Power per unit volume, KW/dm^3	Weight/Power Ratio, Kg/KW	Approx. best BSFC, g/KW h
Diesel Engines									
Passenger Cars	4S	17 − 23	0.075 − 0.1	1.2 − 0.9	4000 − 5000	5 − 7.5	18 − 22	5 − 2.5	250
Trucks, NA	4S	16 − 22	0.1 − 0.15	1.3 − 0.8	2100 − 4000	6 − 9	15 − 22	7 − 4	210
Trucks, TC	4S	14 − 20	0.1 − 0.15	1.3 − 0.8	2100 − 4000	12 − 18	18 − 26	7 − 3.5	200
Locomotive, Industrial, Marine	4S, 2S	12 − 18	0.15 − 0.4	1.1 − 1.3	425 − 1800	7 − 23	5 − 20	6 − 18	190
Large Engines, Marine and Stationary	2S	10 − 12	0.4 − 1	1.2 − 3	110 - 400	9 − 17	2 − 8	12 − 50	180

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Text Book:
Internal Combustion Engine Fundamentals
By John B Heywood
Published By: McGraw-Hill Book Company